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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,668	08/22/2001	Hanae Nakatani	46271	6697

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WASHINGTON, DC 20036-3307

EXAMINER
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DICUS, TAMRA

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 01/16/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/933,668

Applicant(s)

NAKATANI ET AL.

Examiner

Tamra L. Dicus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 October 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Response to Amendment*

The 102(b) rejection of the previous Office Action is canceled. Cancellation of claim 6 is acknowledged.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al. and [http://www.paperloop.com/pp\\_mag/paperhelp/2\\_3\\_6.shtml](http://www.paperloop.com/pp_mag/paperhelp/2_3_6.shtml).

Kojima discloses several examples of ink jet recording sheets (printing material) comprising a base paper covered on both sides by a polyolefin resin of low and high density polyethylene (same polymers as applicant uses) at col. 7, lines 40-44, with the polyolefin resin-coated paper support (base) having a thickness of 50-300 microns (see col. 7, line 35), where a thickness of the resin coated layer has a thickness of 5-50 microns (see col. 7, line 67), meeting the requirements of claims 1, 2 and 4 values of 8 or more and less than 20 microns. The recording sheet further comprises an ink receptive layer on either one or both sides of the paper (see col. 4, lines 50-54), containing inorganic fine particles of antistatic agents or pigments like silica (see col. 4, line 41; col. 5, line 66; col. 13, line 67), a hydrophilic binder of polyvinyl

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alcohol, and an amphoteric surfactant in an amount of 0.1 to 5% by weight at col. 7, lines 15-19 meeting the limitations of claims 7 and 8 at col. 9, lines 20-32. Kojima further discloses the polyethylene resins used on the base paper may be a low-density polyethylene, a medium-density polyethylene, a high-density polyethylene or a mixture thereof and further explains the low-density polyethylene has a density of 0.915-0.930 g/cm<sup>3</sup> and the high-density polyethylene has a density of 0.950 g/cm<sup>3</sup> or higher and depending on how the polyethylene resins are used, alone or in combination, it is possible to have different densities at col. 5, lines 15-21. Since the polymer resins of claim 1 are the same and have a base paper covered in the same polyolefin resin on both sides of the paper (this is equivalent to the polyolefin resin layer at the opposite surface) with the same thickness as per instant claim 1, ranging between 50-300 microns at col. 4, lines 58-62 and at col. 5, lines 31-35 the thickness of the resin coated paper on only one side or both sides is between 5-50 microns, which is included in applicant's claimed range of 5-50 microns; therefore, the relation equation  $\{(B+C)/A\}$  will equal 0.15 to 0.45, and the ratio of polyolefin resin layer thicknesses on or opposite the ink receptive layer surface of claim 3 will be less than 1. With regards to the base paper density between 0.60 and 1.05 g/m<sup>3</sup>, Kojima teaches a support may be of woodfree paper, nonwoven fabrics, or natural pulp (same as applicants) at col. 9, lines 8-15 and col. 10, lines 38-53. Such a property as the density of the base paper is result effective and therefore optimizable. Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, and if one so desires to manufacture a base paper between 0.60 and 1.05 g/m<sup>3</sup>, one would definitely be motivated by obvious reasons such as cost, a thinner paper will provide a cost savings. See further reference

[http://www.paperloop.com/pp\\_mag/paperhelp/2\\_3\\_6.shtml](http://www.paperloop.com/pp_mag/paperhelp/2_3_6.shtml) defining bulk and density of papers

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may very well range between 0.60 and 1.05 g/m<sup>3</sup>. Also, Kojima teaches the base paper may be calendered to improve surface smoothness at col. 10, lines 50-55.

Kojima fails to expressly disclose fumed silica in an amount of 50 to 90 % by weight, as per amended claim 5, and Kojima is further silent to fumed silica having a particle size of 5 nm to 50 nm, as in amended claim 1. Kobayashi, an analogous art, teaches processing inorganic fine inorganic silica in a dry process to produce "fumed silica". Kobayashi explains using a flame hydrolysis process in which silicon halide is hydrolyzed in a high-temperature gas phase to obtain silica containing no water, and an arc process in which siliceous sand and coke are heated, reduced and vaporized by means of arc in an electric furnace, followed by oxidizing with air, to obtain anhydrous silica at col. 6, lines 27-39. The silica fine particles are 3 to 10 nm and 10 to 100 nm, shown in col. 5, line 50 and col. 6, lines 56-57. This is in applicant's claimed range of 5 to 50 nm, as in new claim 10. Further regarding new claim 10, Kobayashi teaches a BET in the range of 100 to 250 m<sup>2</sup>/g, meeting Applicant's range of 100 to 400 m<sup>2</sup>/g. It would have been obvious to one of ordinary skill in the art to modify Kojima's ink jet recording sheet to include fumed silica size of 5 to 50 nm because Kobayashi teaches fumed silica easily forms a three-dimensional structure having particularly high void volume which is required for excellent ink absorptivity (col. 5, lines 1-15). Further, it would have been obvious to one of ordinary skill in the art to further optimize the amount of particles added to provide fumed silica in the amount of 50 to 90 wt. % as in claim 5, and in claim 11 in an amount from 10 to 35 g/m<sup>2</sup> because Kojima teaches that in order to control the values of chroma L, a and b at the surface of the support on which the ink-receiving layer is to be coated, various colorants, such as silica, may be added to the base paper layer, the intermediate layer, or the resin coat layer and that the amount of such

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colorants may be optionally changed depending on the hue characteristics or coating weight in order to exhibit excellent light resistance and heat resistance of the ink-receiving layer at col. 10, lines 10-30.

Regarding claim 12, Kojima teaches a subcoat (equivalent to subbing) layer on a support with an ink-receiving layer over it at col. 8, lines 20-25, the subcoat layer may be of a water-soluble polymer or latexes. While Kojima is silent to the basis weight of 10 to 500 mg/m<sup>2</sup> in which Kojima provides the subcoat/subbing layer. However, it would have been obvious to one of ordinary skill in the art to modify the basis weight range, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272. Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, and if one so desires to manufacture a base paper between 0.60 and 1.05 g/m<sup>3</sup>, one would definitely be motivated by obvious reasons such as cost, a thinner paper will provide a cost savings. See further reference [http://www.paperloop.com/pp\\_mag/paperhelp/2\\_3\\_6.shtml](http://www.paperloop.com/pp_mag/paperhelp/2_3_6.shtml) defining bulk and density of papers may very well range between 0.60 and 1.05 g/m<sup>3</sup>.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2001/0004487 A1 to Kaneko et al. in view of USPN 5,605,750 to Romano et al. and further in view of USPN 5,677,067 to Kojima et al.

Kaneko discloses a water resistant support such as a plastic resin film including a polyester film, or a resin-laminated paper in which a polyolefin resin such as polyethylene is laminated on the front and/or back surfaces of paper at paragraph [0011], lines 7-11 and paragraph [0057], pp. 5-6, where the thickness of the resin layer range is between 5 and 50

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microns, which is included in applicant's ranges of 5 to 25 microns or 8 to 20 microns as per instant claims 1, 2, and 4. The resin layer has an option of containing polyolefin resin may include a homopolymer of an olefin such as low density polyethylene, high density polyethylene, polypropylene, polybutene, polypentene.; a copolymer comprising two or more olefins such as an ethylene-propylene copolymer; or a mixture thereof, and these polymers having various densities at paragraph [0055]. Paragraph [0052] includes of suitable base paper supports natural pulp.

Although, Kaneko does not explicitly disclose the density of the base paper being between 0.60 to 1.05 g/cm<sup>3</sup>, it is an optimizable result effective variable. Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, and if one so desires to manufacture a base paper between 0.60 and 1.05 g/m<sup>3</sup>, one would definitely be motivated by obvious reasons such as cost, a thinner paper will provide a cost savings. See further reference [http://www.paperloop.com/pp\\_mag/paperhelp/2\\_3\\_6.shtml](http://www.paperloop.com/pp_mag/paperhelp/2_3_6.shtml) defining bulk and density of papers may very well range between 0.60 and 1.05 g/m<sup>3</sup>.

Kaneko does not expressly disclose the base paper being between 50 and 300 microns. Romano teaches a base paper coated with a microporous layer comprising inorganic silica particles, a matrix of thermoplastic polyolefin resin at col. 3, lines 26-36 made of LDPE, MDPE, or HDPE ranging from 0.910-.965 g/cm<sup>3</sup> in Table 1, col. 6. Romano teaches the thickness of a base paper support can be between 50 to 500 micrometers, with a preference from 75 to 300 micrometers at col. 2, lines 45-46, which is included in applicant's range of 50 to 300 micrometers. It would have been obvious to one of ordinary skill in the art to modify the ink jet recording material of Kaneko to provide a relation equation  $\{(B+C)/A\}$  to equal 0.15 to 0.45,

and a ratio of polyolefin resin layer thickness on or opposite the ink receptive layer surfaces to be less than 1 since Romano teaches the same materials for the same purpose as applicant and Romano discloses conventional thicknesses used for the materials.

Regarding claims 5 and 11, concerning the amount of fumed silica added, Kaneko teaches at paragraph [0012] fumed silica is contained in the ink-receptive layer in an amount of about  $8 \text{ g/m}^2$  or more, more preferably in the range of about 10 to about  $30 \text{ g/m}^2$ . Hence, it would have been obvious to one of ordinary skill in the art to modify the amount of fumed silica since Kaneko teaches if the amount is less than the above range, ink-absorption capacity is sometimes poor in [0012]. Also, Kaneko explains an amount of hydrophilic binder is preferably about 40% by weight or less, more preferably about 10 to about 30% by weight based on the amount of the fumed silica. By making the ratio of the hydrophilic binder as mentioned above, ink-absorption capacity is improved but preservability after printing, particularly gas resistance is lowered. Romano also teaches the microporous layer comprising inorganic silica particles added in an amount of 40 to 90 weight percent, which is included in applicant's range of 50 to 90% by weight at col. 3, lines 32-36.

Further regarding claims 1 and 5, inorganic particles such as fumed silica are options for inclusion in an ink receptive layer on a paper support as taught by Kaneko in paragraph [0043]. Kaneko further describes his preference of including fumed silica having an average primary particle diameter of 5 to 30 nm. In paragraph [0044], Kaneko explains these solid fine particles may be added in an amount ranging from 10 to 400% by weight, and that a hydrophilic binder may be added in an amount of 50% by weight or less, which is included in applicant's ranges of 10 to 25% by weight as per instant claim 9.



Regarding claims 7 and 8, Kojima teaches the use of an amphoteric surface active agent (surfactant) added to the ink-receiving (receptive) layer in an amount of 0.1 to 7% by weight at col. 13, lines 45047, which is included in the applicant's range of 0.1 to 5% by weight. See also Kaneko Examples 1 and 2 teaching adding an amphoteric surfactant in to the ink-receptive layer.

Regarding new claim 10, Kaneko teaches in paragraph [0020] using fumed silica having an average primary particle size of 50 nm or less, more preferably 5 to 30 nm, meeting Applicant's claimed range of 5 to 20 nm, and a specific surface area measured by the BET (Brunauer-Emmett-Teller) method of 200 m<sup>2</sup>/g or more (preferably 200 to 500 m<sup>2</sup>/g), meeting applicants claimed range of 100 to 400 m<sup>2</sup>/g.

Regarding claim 12, in Example 1 of Kaneko, Kaneko teaches a lower layer (subbing layer) containing 10 to 500 mg/m<sup>2</sup> of a water-soluble polymer on the surface of a support producing various ink-jet sheets, especially note Table 1. Hence, it would have been obvious to one of ordinary skill in the art to further include an additional subbing layer containing a water-soluble polymer in an amount since Kaneko teaches in paragraph [0074] that changing the amount in g/m<sup>2</sup> it is possible to obtain various kinds of ink jet sheets.

Regarding claims 13 and 14, in paragraph [0029] Kaneko uses a hydrophilic binder, a cross-linking agent (film hardening agent) of said binder. Kaneko's specific examples of the cross-linking agent may include an aldehyde type compound such formaldehyde and glutaraldehyde; a ketone compound such as diacetyl and chloropentanedione; bis(2-chloroethylurea)-- 2-hydroxy-4,6-dichloro-1,3,5-triazine, a dioxane derivative such as dihydroxydioxane, a cross-linking agent such as boric acid and a borate, used singly or in

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combination of two or more. Kaneko's preference is to use boric acid or a borate. See also Example 10.

### ***Response to Arguments***

Applicant's arguments filed 11-4-02 have been fully considered but they are not persuasive.

In response to Applicant's argument that Kojima and Kobayashi are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Applicant argues that the combination of references is not tenable. Applicant argues that the teaching of Kobayashi do not remedy the deficiencies of Kojima. In this case, both references are nonabsorptive supports and will act in a similar manner. The support of Kojima may be transparent or opaque and Kobayashi teaches fumed silica on a transparent support. Kojima's support is indeed for ink jet applications and teaches a support may be of woodfree paper, nonwoven fabrics, or natural pulp (same as applicants) at col. 9, lines 8-15 and col. 10, lines 38-53. That the density of the base paper support is not disclosed is irrelevant as such a property as density is result effective and therefore optimizable.

Applicant's further allege that Kaneko does not disclose the density of the base paper support. Again, as aforementioned, density is result effective and therefore optimizable.

In response to Applicant's argument that Kaneko, Romano, and Kojima are nonanalogous art, it has been held that a prior art reference must either be in the field of

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applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). All references cited are very much applicable, as all are again nonabsorptive supports functioning similarly and comprising similar materials and amounts. See record.

### **CONCLUSION**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tamra L. Dicus whose telephone number is (703) 305-3809. The examiner can normally be reached on Monday-Friday, 7:00-4:30 p.m., alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on (703) 308-0449. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 746-8329 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Tamra L. Dicus  
Examiner  
Art Unit 1774

January 10, 2003

CYNTHIA H. KELLY  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

